

## **ASD Weekly Highlights for the Week Ending 27-Jan-2006**

### **Operations**

Running beam for Commissioning Studies:

Running commissioning, making progress,

A Nice closed orbit solution was found, but some mysteries in the Injection Chicane and HEBT remain

Fault Studies are complete in the Injection and Extraction straight sections

Problem areas

Water System Trips

MPS Trips

Kicker noise

Work coordination:

Operations requested close coordination with all work crews inside the machine during repair periods and maintenance days. For fixing Breakdowns this means calling the Control Room at junctures in the work so that resources can be coordinated. For maintenance tasks we will be looking for a more complete description of the task, including:

Estimated time to complete,

Resources needed, people and equipment (availability),

Where the work takes place (restrictions and requirements)

SNS-DOE TVA Electric Power Rate Negotiation

We are examining the results from the first meeting.

Beginning to look at Barcoded equipment in the Ring

Have Magnet data and some power supply data

Work completed on SNS Work Flow Process

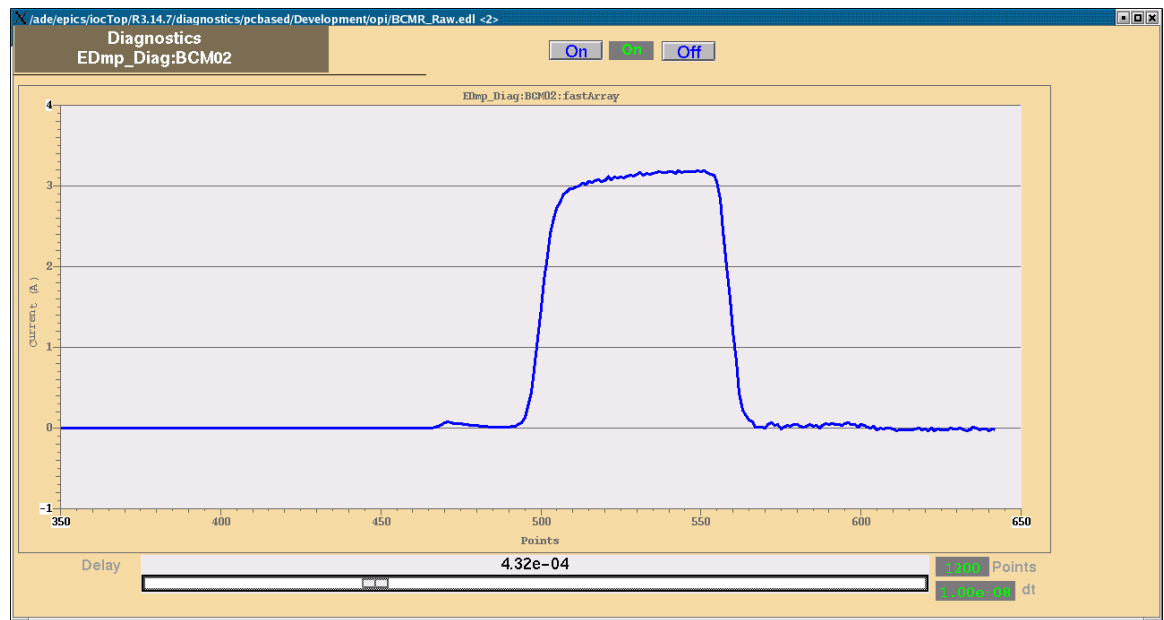
Will go out for review

Integrating Work Flow and Datastream

Meetings of the working group are planned

### **Accelerator Physics**

- Ring commissioning is going well. All major systems have been turned on and tested at least at a basic level. On Thursday, Jan. 26 we reached our milestone of greater than  $1 \times 10^{13}$  protons per pulse delivered to the extraction beam dump. The image below shows the beam current monitor at the entrance to the extraction beam dump, indicating a total charge of approximately  $1.26 \times 10^{13}$  protons per pulse.



## Diagnostics

- Wire Scanners: Three new wire scanners 20, 21, 22 are prepared in the HEBT and are timed in. Signals look very good. Physics commissioners made some HEBT emittance studies using these wires.
- Commissioning Support: 2 Ring BPMs had bad electronics. We will replace those on Friday. High voltages settings of neutron detectors in low energy MEBT will be set to -1300 volts to support machine protection for 1mili-second beam studies. Per Commissioners and operation request for high beam intensity studies, we will keep the MPS thresholds low to protect the machine. MPS lead engineer will take care of that.

## RF Systems

### Linac RF

- Received shipment from LANL of transmitter & HV tank. One more to go.
- Cleaned and prepared HV tank returned from SLAC for use as 2.5 MW klystron ready spare.
- Gathering waveguide components to modify test stand in support of coupler testing.
- Continued to support Ring beam commissioning with very few RF-related problems.
- Ring RF wall current monitor commissioned. Mountain range display used to determine Ring frequency.
- Ring RF systems turned on for first time with beam.
- Alexander Brandt, DESY PhD student, visiting to participate in beam loading compensation discussions and experiments.

- RFTF test stand modifications began after finishing Thales klystron testing last week.

### **Ring RF**

- Wall Current monitor is functional.
- Had a LLRF control module fail in Station RF13 and replaced it. All stations are again operational.
- Set up timing for all four stations and adjusted the phase for Stations RF11 and RF12.
- Demonstrated first RF bunching with a single cavity operational.
- We energized Station RF11 and RF12 and demonstrated RF bunching of a single injected turn stored for 200 microseconds.
- Tested Grid Bias Boost function in preparation for high current circulating beam. This feature is used to increase the quiescent current through the final amplifier tube to insure that beam current does not drive the tube into cutoff.

### **Ion Source**

- The source with the external antenna delivered up to 45 mA for 0.1 ms long pulses at 1 Hz. After several days of operation its output dropped to 33 mA. Testing continues.
- Thomas Meinschad from CERN, Doug Moehs from FNAL, and Martin Stockli from SNS met with Jens Peters at DESY to test the DESY source with the SNS RF amplifier for different requirements.
- Between 29 and 25 mA were produced with 3 ms long pulses at 0.25 Hz, practically demonstrating the requirements for FNAL and CERN. SNS upgrade requirements could not be tested due to being designed for low power and duty cycle. In addition the emittance of the DESY source seems to be significantly larger than our source. We discussed how we can cross check the emittances.

### **Controls**

- The week was spent supporting the ring commissioning run and participating in Target installation and testing. The accelerator control system is running well; the major issues being console crashes of EDM and the need to bypass numerous MPS inputs due to extraction kicker EMI noise-induced false trips. Other issues included momentum scraper motion control and spurious Injection Dump fast valve trips.

- A soft IOC was created to keep track of tuner motor movements. The number of movements and total motion within a given hour and within a given day are now archived and can be seen using the ArchiveViewer.
- Initial tests of the MEBT Chopper indicated the need for more delay adjustment capability. This was added and the chopper is now in use. A preliminary design meeting was held regarding the new LEBT Chopper switch electronics to be designed this year.
- A new LLRF adaptive feedforward (AFF) algorithm was tested on the test cavity, and then successfully deployed and tested on the linac.
- There was continued slow progress on error handling for the Archiver. So far memory leak tests have been successful.
- The Target Moderator controls (ACE) were successfully integrated into the ICS network this week. Screens are now available in the Target Control Room. The next step is to add Channel Access Security.
- There was continued work on the testing, repair and modification of Chipmunks. (One failure last week.) TPPS programming and testing continued as did construction, installation and testing of the IPPS. As much fabrication as parts allowed was completed for the Beam Line 4 IPPS user panel. Remaining parts should arrive next week.
- The Group almost (but not quite) completed its PADS Performance Plans.

## **SRF Facility**

### **Project Upgrade**

#### **Survey and Alignment**

- RTBT:
  - Re-map QH28 after removal and replacement on rad-hard stand (repeatability test).
  - Completed alignment of guide rails on rad-hard quads.
  - Mapped rad-hard guide rails with respect to magnet fiducials.
- TARGET:
  - BL4A: Chopper NCS009-3 re-set for elevation after kinematic mount replacement.
  - BL3: Steel base plate fiducials mapped and corners located for elevation.

BL2: Scribe/chalk lines re-established in 2TU tank.  
 BL2: Glue on fiducials replaced in 2TU tank.  
 Target module mapped for elevation in hot cell.  
 BL2: Add fiducials to select guides to replace fiducials soon to be lost.  
 BL4A: Prepare chopper NCS009-1 for fiducialization (ream fiducials, glue-on additional fiducials and set the chopper for elevation).  
 BL4A: Chopper NCS009-1 fiducialized.  
 BL6: Map mirror angles on shutter face.  
 BL4A: Chopper NCS009-3 fiducialized.  
 BL4A: Prepare chopper NCS009-2 for fiducialization (ream fiducials, glue-on additional fiducials and set the chopper for elevation).  
 BL4A: Chopper NCS009-2 fiducialized.  
 BL2: completed re-alignment of neutron guides in funnel section.  
 BL4B: Re-install gauge plate on stand and re-level (for BL4B elevation change) in Mag. Measure.  
 BL4B: Prepare chopper LR60-3 for fiducialization (ream fiducials, glue-on additional fiducials and set the chopper for elevation).  
 BL4B: Chopper LR60-3 fiducialized.  
 BL4B: Prepare chopper LR60-2 for fiducialization (ream fiducials, glue-on additional fiducials and set the chopper for elevation).  
 BL4B: Chopper LR60-2 fiducialized.

- Miscellaneous:

Re-organization of S&A lab nearly completed..  
 Equipment cart assembly.  
 Techs continued with online update of safety courses

## Cryo Systems

## Mechanical Systems

### Shielding progress.

### RTBT Systems Installation Activities

- The Ring Injection Thick Foil spare assembly was received.
- The RTBT HARP mechanism testing continued in the lab.
- The RTBT HARP vessel was sent out for flange modification.
- The RTBT Target Quad Q28 was aligned on the test stand.
- The RTBT Target Quad's alignment guides were modified.
- The RTBT Target Quads' strong-back fixtures were installed.
- The RTBT Target Quads' quick disconnect clamp assemblies were sent out for modification.
- The RTBT Target Quads' first bellows assembly was welded and leak tested.
- The RTBT Target quad overhead shielding blocks' welding assembly continued.

## **Electrical Systems**

### **Power Supplies**

- Supported MEBT Chopper testing, preparing system for beam operations
- Formulated plan for and met with key players on ring noise mitigation
- Redesigning key HVCM assemblies to prevent premature failures
- Restarted IGBT gate driver development testing